



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION IX  
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San Francisco, CA 94105

March 28, 2006


William Harris, PhD  
Regional Environmental Coordinator  
AFRPA Western Region Execution Center  
3411 Olson Street  
McClellan, CA 95652-1003

Re: **Split Sampling Plan for George AFB**

Dear Dr. Harris:

This letter provides EPA's subject split sampling plan (SSP) that describes the scope of our planned field activities, including a field audit, scheduled for week of April 10, 2006. The attached SSP presents the planned sampling locations, data comparison criteria, and logistical requirements. The objective of the field audit is to verify that the AF's field sampling teams are following approved Sampling and Analysis Plan procedures.

Our field team will contact Calvin Cox upon arrival at George AFB to confirm where to attend the health and safety briefing prior to field activities. Thank you and your staff for supporting our field event. If you have any questions regarding the attached SSP, please call me at extension (415) 972-3193.

  
James Chang  
Remedial Project Manager

Attachment: George AFB Split Sampling Plan

cc (email w/attachment):  
Jeheil Cass  
Calvin Cox  
Gilbert Dimidjian

File:050SSPltr



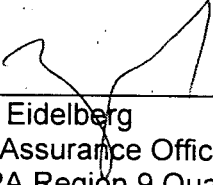
DRAFT  
SPLIT SAMPLING PLAN

GEORGE AIR FORCE BASE  
San Bernardino, California

BASEWIDE  
GROUNDWATER MONITORING PROGRAM  
APRIL 2006


Prepared by:  
U.S. EPA Region 9 Laboratory  
Field and Biology Team  
1337 S. 46th Street, Bldg 201  
Richmond, California 94804

Approved

  
\_\_\_\_\_  
Mr. Joe Eidelberg  
Quality Assurance Officer  
U.S. EPA Region 9 Quality Assurance Office

3/20/06  
Date

Approved

  
\_\_\_\_\_  
Dr. Ms Eugenia Mc Naughton  
Quality Assurance Manager  
U.S. EPA Region 9 Quality Assurance Office

3/21/06  
Date



FINAL  
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Ms Eugenia Mc Naughton  
Quality Assurance Manager  
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Date

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## 1 Introduction

The United States Environmental Protection Agency (USEPA) Region 9 Laboratory, Field and Biology (FAB) team prepared this Split Sampling Plan (SSP) at the request of the USEPA Region 9 Federal Facilities Cleanup Branch. The purpose of the SSP is to specify the anticipated split sample locations, present the data comparison criteria, and itemize the logistical support needed from the US Air Force (USAF) sampling contractor. This SSP is applicable to groundwater sampling activities at George Air Force Base, California in the spring of 2006. This sampling event is part of a larger ongoing comprehensive quarterly groundwater-monitoring program.

The FAB team will obtain split samples for volatile organic compounds (VOCs), organochlorine pesticides (OCPs), natural attenuation parameters, and landfill metal surrogates. USEPA will conduct sample analysis under the Contract Laboratory Program (CLP), and at the USEPA Region 9 Laboratory in Richmond, California.

The FAB team will also conduct a field audit concurrent with the split sampling. The purpose of the field audit is to verify the adherence to the procedures set forth in the approved sampling and analysis plan (SAP) by the field sampling team under contract to the USAF. The FAB team will conduct the field audit for adherence to the following documents.

*Basewide Sampling and Analysis Plan, George Air Force Base, California HydroGeoLogic 1998.*

*Final 2003 Annual Sampling and Analysis Plan Addendum Basewide Groundwater Monitoring Events, Operable Units 1, 2, and 3 George Air Force Base, California MWH Americas, Inc. July 2003.*

Based on discussions with the USAF, and their sampling contractor, Montgomery Watson-Harza (MWH), the field audit and collection of split samples will occur during the week of April 10<sup>th</sup>, 2006.

## 2 Site Location and Background

George Air Force Base is located in San Bernardino County approximately eight miles northwest of Victorville, California (Figure 1). The trichloroethylene (TCE) groundwater monitoring data presented in the addendum to the Basewide Sampling and Analysis Plan (hereafter referred to as the SAP) dates back to 1992. Section 2.0 of the SAP presents additional project background.

The USAF prepared the addendum to the SAP to guide basewide groundwater monitoring activities at operable units (OU) 1, 2, and 3, (Figure 2, MWH) and other focused lower aquifer monitoring events. The FAB team prepared this SSP for use in conjunction with the Basewide SAP. The EPA Region 9 audit team will perform the field audit to determine adherence to the procedures specified in Section 5 (Field Operations), Section 6 (Environmental Sampling), Section 7 (Field Measurements), and Section 8 (Record Keeping) of the SAP.

### 3 Scope and Objectives

The scope of the split sampling includes analysis of groundwater samples and performance evaluation (PE) samples for VOCs (primarily TCE), OCPs (primarily Dieldren), natural attenuation parameters (i.e., alkalinity, total organic carbon, and nitrate), and landfill surrogates (i.e., chloride, nitrate, sulfate, and total dissolved solids). The objective of the split sampling is to determine if the values reported by the USAF are comparable to those values obtained by the USEPA. The scope of the field audit includes sample collection, preservation, handling, equipment decontamination, packing, shipment, and documentation procedures specified in the SAP. The objective of the field audit is to verify that the USAF sampling contractor follows the approved procedures specified in the SAP and published EPA guidance.

The USAF agreed to provide necessary sample containers and chemical preservatives. The FAB team representative will receive the split samples collected by the USAF sampling contractor label, pack, and, ship the samples to the designated laboratory. Attachment 1 - Split Sampling Summary identifies the locations (wells) of split samples collection and field oversight. Attachment 2 - Target Analyte List presents the list of analytes for each analytical procedure specified above.

### 4 Rationale for Sample Locations and Field Audit

#### 4.1 Groundwater Samples

Based on previous sampling activities at George AFB, the sampling approach is limited to dedicated and non-dedicated, low-flow submersible Grundfos™ pumps. USEPA chose sample locations to cover most of the chemical tests performed at George AFB under the Basewide Groundwater-Monitoring Program, and the range of TCE concentrations in the upper and lower aquifer at OU's 1, 2 and 3. Based on discussions with MWH, the wells identified for split sampling are as follows:

<u>Well ID</u>	<u>Parameters</u>	<u>Description</u>
FT-03	VOCs	OU 1/OU 3/FT-19
MW-49	VOCs	OU 2/OU 3 Upper Aquifer
MW-69	VOCs	OU 2/OU 3 Upper Aquifer
NZ-27	VOCs	OU 1 Upper Aquifer
NZ-89	OCPs	OU 3 Upper Aquifer
NZ-107	VOCs, LF Surrogates	OU 1/OU 3 Lower Aquifer - Landfill
WZ-06	VOCs, Nat Att. Par	OU 3/Site OT-51 Upper Aquifer

The FAB team representative will obtain sample at a minimum of seven well locations. Additional split samples will only be obtained at the direction of the USEPA RPM.

#### 4.2 Field Audit

Mr. Greg Nagle of the USEPA Region 9 FAB team and Mr. Joe Eidelberg of the USEPA Region 9 Quality Assurance Office (QAO) will conduct the field audit. The USEPA auditors will conduct the field audits to determine whether the sample collection procedures

performed are in accordance with the Basewide SAP, and published EPA guidance. Most critical for the sampling of VOCs are measures that minimize the agitation of water samples that will volatilize the VOCs. The USEPA auditors will communicate any critical deviations from approved procedures to the USEPA Remedial Project Manager (RPM) James Chang, while in the field for timely resolution with the USAF.

## **5 Field Methods and Procedures**

### **5.1 Sample Collection**

The FAB team representative will obtain samples collected by the USAF contractor using both dedicated and non-dedicated, low-flow submersible Grundfos™ pumps. Sample volumes, container types, and preservation requirements are specified in Attachment A. The USAF contractor will fill sample containers alternately, with the USAF sample collected first, followed by the sample for the USEPA, and then fill the second USAF sample and so on. The FAB team representative observing the sample collection will take custody of one set of sample containers as sampling at a given well is completed. The FAB team representative will appropriately label the sample containers. The FAB team representative will also be responsible for chain-of-custody (COC) using Forms II Lite software and maintaining other field documentation as project records.

### **5.2 Quality Control Samples**

Appropriate quality control (QC) samples for this project will include a trip blank and a temperature blank for each shipment, and a matrix spike/matrix spike duplicate for each analytical method. The FAB team will not obtain a field duplicate sample. Attachment 1 lists the QC samples to be collected for this split sampling event. The USAF agreed to provide a trip and temperature blank for each day split samples are collected.

### **5.3 Performance Evaluation Samples**

The USEPA will provide a performance evaluation (PE) sample for VOCs, OCPs, alkalinity, total organic carbon, chloride, nitrate, sulfate, and total dissolved solids for analysis by both the USEPA laboratories and USAF laboratory. The USEPA FAB team and USAF sampling contractor will submit PE samples to the respective laboratories with sample shipments using the same sample container types used for the primary and split samples. Both the USEPA and the USAF contractor will submit these samples with fictitious sample identifiers so that the laboratory cannot readily identify them as PE samples. USEPA refers to this technique as "double blind" submission. The USEPA QAO may request containers from the USAF contractor in advance so that the Quality Assurance Technical Support (QATS) contractor can prepare the PE samples in the same container type as used in the field. The USEPA QAO will provide a PE Sample Report to the USEPA RPM under separately.

## 5.4 Methods of Analysis

The USEPA will analyze the VOC, OCP samples using the CLP as designated by the Region 9 Regional Sample Control Coordinator (RSCC) and the EPA Region 9 laboratory will analyze the natural attenuation parameters, and landfill metals surrogates as summarized below.

<u>Parameter</u>	<u>Laboratory</u>	<u>Method of Analysis</u>
Volatile Organic Compounds (VOC)	CLP	SOM01.1
Organochlorine Pesticides (OCP)	CLP	SOM01.1
Total Alkalinity	EPA Region 9	SM2320
Chloride, Nitrate, Sulfate	EPA Region 9	EPA 300.0
Total Dissolved Solids	EPA Region 9	EPA 160.1
Total Organic Carbon	EPA Region 9	EPA 415.1

Attachment 1 presents anticipated split sample locations, container type, sample volume, chemical preservation, and holding time requirements. Attachment 2 provides a list of analytes and quantitation limits.

USEPA reviews all data generated by the CLP to a computer-aided data review and evaluation system (CADRE). The USEPA Region 9 EPA Region 9 laboratory manually reviews data in accordance with SOPs 846 Internal Laboratory EPA Review of ESAT and EPA Generated Data, and 845 Final Chemistry Review and Report Generation. If the results of the split sampling indicate discrepancies between USAF and USEPA laboratory results, additional manual data review and/or external data validation may be required.

## 5.5 Packing and Shipping

The FAB team will ship coolers containing sufficient ice to keep the samples at  $4\pm 2^{\circ}\text{C}$ . The ice in the cooler will be double-bagged to prevent leakage. The cooler will have a custody seal affixed across the cooler lid. The samples will remain in the custody of a FAB team representative until relinquished for shipment to the laboratory. The FAB team representative will ship all samples using an overnight carrier. A COC form will accompany the samples from the point of origin to the designated laboratory. The FAB team will place the COC in a plastic bag taped to the inside of the cooler lid. If samples are shipped on a Friday, the RSCC will be contacted and information regarding Saturday delivery.

## 5.6 Support Required from Air Force Contractor

As discussed in above, the USEPA will require field assistance from the USAF sampling contractor. This support includes providing sample containers, chemical preservative, and split groundwater sample from each of the wells specified in Attachment 1. Based on the split samples anticipated, USEPA is requesting the following:

<u>#</u>	<u>Type</u>	<u>Chemical Preservative</u>
39	40 mL Borosilicate glass vials	Hydrochloric Acid (HCl)
8	1 Liter Borosilicate Glass	none
8	500 mL High Density Polyethylene	none



The USEPA Region 9 QAO may request a set of containers in advance so the QATS laboratory can prepare the PE samples in the same container type as that used in the field. The USEPA is also requesting trip blanks and temperature blanks each day samples are collected. The USEPA may also request advice and directions from USAF sampling contractor regarding the acquisition of ice and other materials near the sampling locations.

As noted in Section 5.3, the USEPA requests the USAF provide for the analysis of a PE sample for each chemical parameter. A USEPA representative will provide these PE samples during the course of split sampling/field audit activities.

The USEPA requests that USAF provide the validated results of analysis to the USEPA RPM as soon as possible. Finally, for reasons discussed in Section 6 (below), the data submission should also include the Method Detection Limit (MDL) for each analyte/parameter.

## 6 Data Evaluation and Reporting

The FAB team will compare results obtained by the USEPA to the results provided by the USAF, and determine if the results are comparable using the criteria below.

Disagreement	Major Disagreement
Difference between results is greater than two times the MDL when one result is less than the MDL	Difference between results is greater than four times the MDL when one result is less than the MDL
RPD of results is greater than 100% if either result is less than 5 times the MDL	RPD of results is greater than 200% if either result is less than 5 times the MDL
RPD of results is greater than 30% if both results are greater than 5 times the MDL	RPD of results is greater than 60% if both results are greater than 5 times the MDL

$$RPD = \text{abs} (R1 - R2) / (R1+R2)/2 * 100\%$$

Where,

R1 = result 1    R2 = result 2

MDL = Method Detection Limit

RPD = Relative Percent Difference

Upon receipt of USEPA and USAF data sets, the FAB team will generate a Split Sampling Report containing all the split and primary sample results, calculated RPD, an evaluation of any outliers, and an overall assessment of the sample data. The FAB team will also prepare a Field Audit Report documenting all findings made in the field. The Field Audit Report and Split Sample Report will be prepared separately.

## 7 Personnel

Mr. Greg Nagle of the USEPA Region 9 FAB team and Mr. Joe Eidelberg of the USEPA Region 9 QAO will conduct the field audit. Mr. Nagle will also be responsible for all split sampling related activities, coordinating field activities with the USAF sampling contractor and preparation of the Split Sampling and Field Audit Reports. Mr. Eidelberg will be also

responsible for coordinating PE sample acquisition and final reconciliation of audit findings. Mr. James Chang, EPA RPM will be responsible for transmitting the audit findings, the split sample results, and the PE sample results to the USAF.

## **8 Health and Safety**

The USEPA audit team will adhere to the site-specific health and safety plans and will attend the daily tailgate health and safety briefing as required. Level D personal protection will be required.

## **9 Schedule**

Split sampling activities will take place during the week of April 10<sup>th</sup>, 2006 and should be complete within two to three days time. The FAB team will submit a Field Audit Report within 21 days of the field audit. Standard laboratory turn-around times are typically 30 days from verified sample receipt of the last sample in a sample delivery group. The FAB team will inform the US EPA RPM when all of the analytical data has been received. The FAB team will submit the Split Sample Report to Mr. James Chang within 21 days of receipt of the laboratory EPA data or the USAF, whichever occurs later. The anticipated schedule is as follows:

<u>Activity</u>	<u>Date</u>
Sample collection begins	April 10 <sup>th</sup> , 2006
Sample collections ends	April 13 <sup>th</sup> , 2006
All samples received by labs	April 14 <sup>th</sup> , 2006
Field Audit Report to EPA RPM	May 5 <sup>th</sup> , 2006
All data received from labs	May 19 <sup>th</sup> , 2006
Split Sample Report to EPA RPM	June 9 <sup>th</sup> , 2006

The anticipated dates above are subject to change.

## **10 References**

Basewide Sampling and Analysis Plan, George Air Force Base, California. HydroGeoLogic 1998.

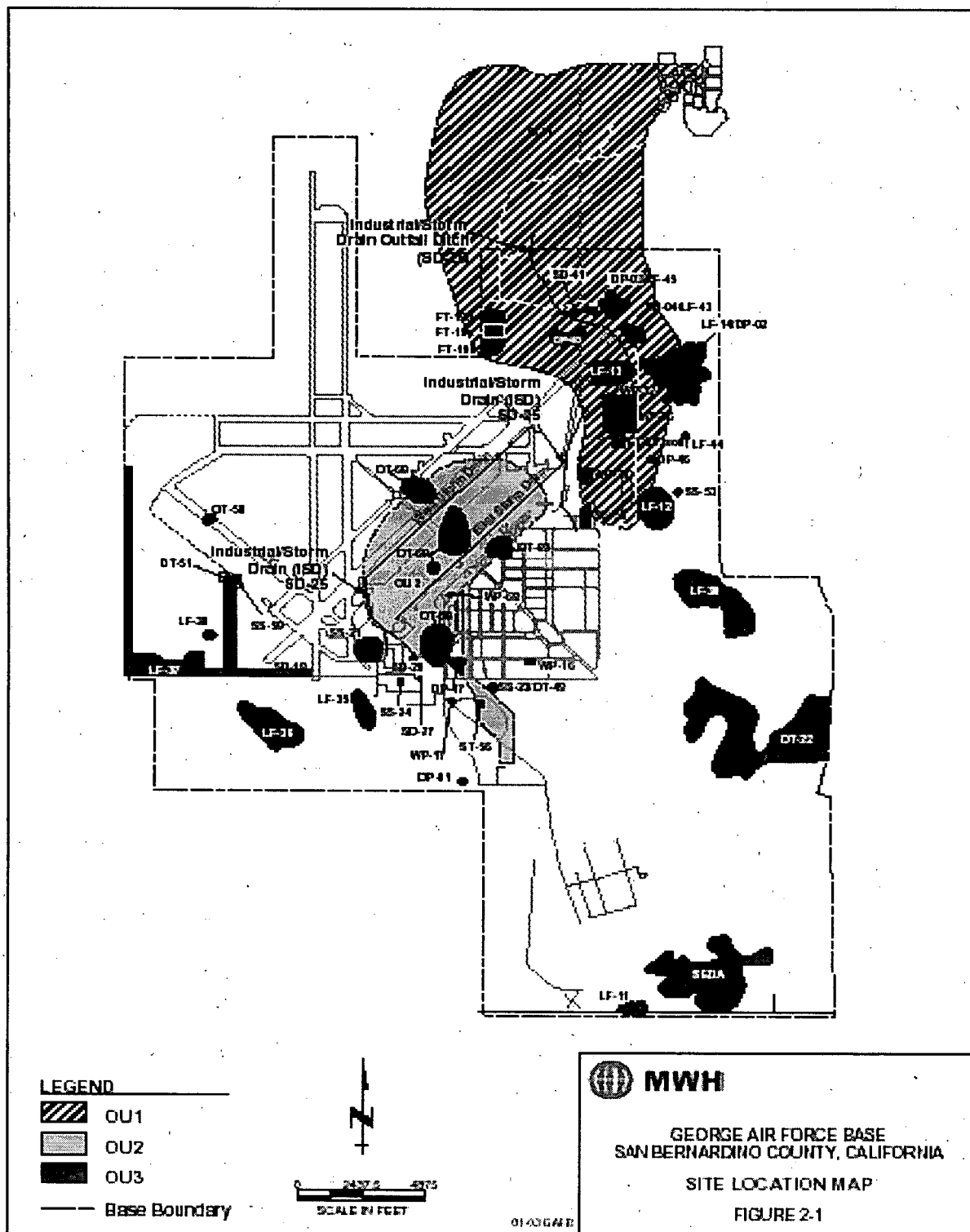
Final 2003 Annual Sampling and Analysis Plan Addendum Basewide Groundwater Monitoring Events, Operable Units 1, 2 and 3 George Air Force Base, California. MWH Americas, Inc. July 2003.

U.S. EPA. Quality Assurance Oversight Plan for George/Norton AFB, October 1998.

Figure 1 - George Air Force Base



Figure 2 – Operable Units



**Attachment 1 - Split Sample Summary**  
**George Air Force Base, April 2006**

Sampling Location	Aquifer	Operable Unit/Site	VOCs SOM01.1 (3X40 ml vial) HCl to pH < 2 Hold = 14 days	OCPs SOM01.1 No chem. pres (2 X 1L) Hold = 7 Days	TOC <sup>a</sup> (3X40 ml vial) HCl to pH < 2 Hold = 28 Days	Alkalinity & Nitrate <sup>a</sup> No chem. pres (500 mL poly) Hold = 14 days & 48 hrs	Anions & TDS <sup>b</sup> No chem. pres (500 mL poly) Hold = 48 hrs & 7 days
FT-03	Upper	OU1,OU3/Site FT-19	1				
MW-49	Upper	OU2/OT-69	1				
MW-69	Upper	OU2	1				
NZ-27	Upper	OU1	1				
NZ-89	Upper	Pesticide AOC		1			
NZ-89 MS/MSD	Upper	Pesticide AOC		2			
NZ-107	Lower	OU1/LF-14	1				1
NZ-107 MS/MSD	Lower	OU1/LF-14	2				2
WZ-06	Upper	OU3/OT-51	1		1	1	
WZ-06 MS/MSD	Upper	OU3/OT-51			2	4	
PE (MW200)	NA	NA	1	1	1	1	1
		<b>Total Samples</b>	<b>9</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>
		<b>Total Containers</b>	<b>27</b>	<b>8</b>	<b>12</b>	<b>4</b>	<b>4</b>

**Notes:**

a - Natural Attenuation Parameters include; Alkalinity by SM 2320, Total Organic Carbon (TOC) by EPA Method 415.1 and Nitrate by EPA Method 300.0

b - Landfill (LF) Metal Surrogates include; Anions analyzed by EPA Method and Total Dissolved Solids (TDS) by E160.1

MS/MSD - Matrix Spike/Matrix Spike Duplicate

Hold = Holding Time

## Attachment 2 - Target Analyte List

### Target Analytes

#### Volatile Organic Compounds (SOM01.1)

	Quantitation Limit (ug/L)		Quantitation Limit (ug/L)
Dichlorodifluoromethane	0.50	Methylcyclohexane	0.50
Chloromethane	0.50	1,2-Dichloropropane	0.50
Vinyl Chloride	0.50	Bromodichloromethane	0.50
Bromomethane	0.50	cis-1,3-Dichloropropene	0.50
Chloroethane	0.50	4-Methyl-2-pentanone	5.00
Trichlorofluoromethane	0.50	Toluene	0.50
1,1-Dichloroethene	0.50	trans-1,3-Dichloropropene	0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	1,1,2-Trichloroethane	0.50
Acetone	5.0	Tetrachloroethane	0.50
Carbon Disulfide	0.50	2-Hexanone	5.0
Methyl acetate	0.50	Dibromochloromethane	0.50
Methylene chloride	0.50	1,2-Dibromomethane	0.50
trans-1,2-Dichloroethene	0.50	Chlorobenzene	0.50
Methyl tert-butyl ether	0.50	Ethylbenzene	0.50
1,1-Dichloroethane	0.50	o-Xylene	0.50
cis-1,2-Dichloroethene	0.50	m, p-Xylene	0.50
2-Butanone	5.00	Styrene	0.50
Bromochloromethane	0.50	Bromoform	0.50
Chloroform	0.50	Isopropylbenzene	0.50
1,1,1-Trichloroethane	0.50	1,1,2,2-Tetrachloroethane	0.50
Cyclohexane	0.50	1,3-Dichlorobenzene	0.50
Carbon tetrachloride	0.50	Dichlorobenzene	0.50
Benzene	0.50	1,2-Dichlorobenzene	0.50
1,2-Dichloroethane	0.50	1,2-Dibromo-3-chloropropane	0.50
1,4-Dioxane	20	1,2,4-Trichlorobenzene	0.50
Trichloroethene	0.50	Trichlorobenzene	0.50

#### Organochlorine Pesticides (SOM01.1)

	Quantitation Limit (ug/L)		Quantitation Limit (ug/L)
alpha-BHC	0.050	Endosulfan II	0.10
beta-BHC	0.050	4,4'-DDD	0.10
delta-BHC	0.050	Endosulfan sulfate	0.10
gamma-BHC (Lindane)	0.050	4,4'-DDT	0.10
Heptachlor	0.050	Methoxychlor	0.50
Aldrin	0.050	Endrin ketone	0.10
Heptachlor epoxide	0.050	Endrin aldehyde	0.10
Endosulfan I	0.050	alpha-Chlordane	0.050
Dieldrin	0.10	gamma-Chlordane	0.050
4,4'-DDE	0.10	Toxaphene	5.0
Endrin	0.10		

## Target Analytes

### Natural Attenuation Parameters

	Quantitation Limit (mg/L)
Alkalinity (SM2320)	5.0
Nitrate (E300.0)	0.1
Total Organic Carbon (E415.1)	2.0

### Landfill Metal Surrogates

	Quantitation Limit (mg/L)
Chloride (E300.0)	0.5
Nitrate (E300.0)	0.1
Sulfate (E300.0)	0.5
Total Dissolved Solids (E160.1)	10